MICRO-EPSILON

More Precision

optoNCDT // Laser displacement sensors (triangulation)

	Ideal for serial and OEM applications
	Laser class 1
	Compact design with integrated controller
312Hz 375Hz 1000Hz	**Measuring rate up to 4kHz**
INTER FACE	**Analog (U/I) RS422 / PROFINET / EtherNet/IP**
*T*rigger *T*eachIn	**Trigger input / teach-in zero-setting / mastering**
	Configuration via web interface or Plug & Play
ASC	**Active-Surface-Compensation**

optoNCDT CL1 laser sensors are used in measurement tasks which require laser class 1. With this laser class, the radiated power is at max. 390 μW, which is significantly lower than laser class 2.
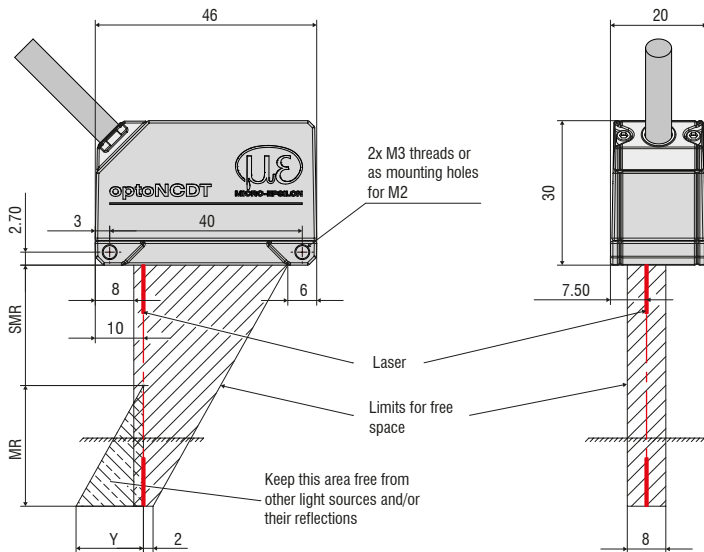
Use in automotive production

Particularly in the field of automotive production, increased demands are being placed on manufacturers to take adequate safety precautions in their production plants, including the use of laser class 1 sensors if people are working in close proximity to laser sensors. For example, this is the case when handling equipment for the installation of interior parts is used where laser sensors precisely align these parts.
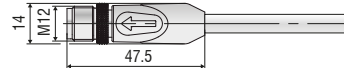
Use in pharmaceutical and medical technology

In medical engineering, laser sensors are often used to determine distances to very sensitive surfaces. Here, optoNCDT 1420 CL1 sensors are used which expend only about one third of the energy of a laser class 2 sensor due to their reduced laser power of max. 390 μW. This enables measurements of even sensitive materials such as substrates without causing any chemical or thermal reaction.

Connector (sensor side)

MR	SMR	Y
10	20	10
25	25	21
50	35	28

Model	ILD1420-10CL1	ILD1420-25CL1	ILD1420-50CL1	on request ILD1420-100CL1	ILD1420-200CL1
Measuring range	10 mm	25 mm	50 mm	100 mm	200 mm
Start of measuring range	20 mm	25 mm	35 mm	50 mm	60 mm
Mid of measuring range	25 mm	37.5 mm	60 mm	100 mm	160 mm
End of measuring range	30 mm	50 mm	85 mm	150 mm	260 mm
Measuring rate [1]	5 adjustable stages: 4 kHz / 2 kHz / 1 kHz / 0.5 kHz / 0.25 kHz				
Linearity	$< \pm 8\,\mu m$	$< \pm 20\,\mu m$	$< \pm 40\,\mu m$	-	-
	$< \pm 0.08$ % FSO				
Repeatability [2]	$0.5\,\mu m$	$1\,\mu m$	$2\,\mu m$	-	-
Temperature stability	± 0.015 % FSO / K			-	-
Light spot diameter (±10 %) SMR	90 x 120 μm	100 x 140 μm	90 x 120 μm	-	-
MMR	45 x 40 μm	120 x 130 μm	230 x 240 μm		
EMR	140 x 160 μm	390 x 500 μm	630 x 820 μm		
smallest diameter	45 x 40 μm with 24 mm	55 x 50 μm with 31 mm	70 x 65 μm with 42 mm	-	-
Light source	Semiconductor laser < 0.39 mW, 670 nm (red)				
Laser safety class	Class 1 in accordance with DIN EN 60825-1: 2015-07				
Permissible ambient light [3]	15,000 lx			-	-
Supply voltage	11 … 30 VDC				
Power consumption	< 2 W (24 V)				
Signal input	1 x HTL laser on/off; 1 x HTL multifunction input: trigger in / zero setting / mastering / teach				
Digital interface	RS422 (16 bit) / PROFINET [4] / EtherNet/IP [4]				
Analog output	4 ... 20 mA / 1 … 5 V with PCF1420-3/U cable (12 bit, freely scalable within the measuring range) [5]				
Switching output	1 x error output: npn, pnp, push pull				
Connection	integrated cable 3 m, open ends, min. bending radius 30 mm (fixed installation); or integrated pigtail 0.3 m with 12-pin M12 plug (see accessories for suitable connection cable)				
Installation	Screw connection via two mounting holes				
Temperature range Storage	-20 ... +70 °C (non-condensing)				
Operation	0 ... +50 °C (non-condensing)				
Shock (DIN EN 60068-2-29)	15 g / 6 ms in 3 axes, 1000 shocks each				
Vibration (DIN EN 60068-2-6)	20 g / 20 … 500 Hz in 3 axes, 2 directions and 10 cycles each				
Protection class (DIN EN 60529)	IP65				
Material	Aluminum housing				
Weight	approx. 60 g (incl. pigtail), approx. 145 g (incl. cable)				
Control and display elements	Select button: zero / teach / factory setting; web interface for setup [6]: with selectable presets, peak selection, video signal, freely selectable averaging, data reduction, setup management; 2 x color LEDs for power / status				

FSO = Full Scale Output
SMR = Start of measuring rang, MMR = Mid of measuring range, EMR = End of measuring range
The specified data apply to white, diffuse reflecting surfaces (Micro-Epsilon reference ceramic for ILD sensors)
[1] Factory setting 2 kHz, modifying the factory setting requires the IF2001/USB converter (see accessories)
[2] Measuring rate 2 kHz, median 9
[3] Illuminant: light bulb
[4] Connection via interface module (see accessories)
[5] The D/A conversion is executed at 12 bits
[6] Connection to PC via IF2001/USB (see accessories)

Accessories for all optoNCDT series
Power supply
- PS 2020 (power supply 24 V / 2.5 A, input 100 - 240 VAC, output 24 VDC / 2.5 A, mounting onto symmetrical standard rail 35 mm x 7.5 mm, DIN 50022)

Controller unit for evaluation and signal conversion
- C-Box/2A (controller for conversion and evaluation of up to 2 sensor signals)

Interface card
- IF2008PCI / IF2008PCIe (interface card for multiple signal processing; analog and digital interfaces)

USB converter
- IF2001/USB RS422/USB converter (converter for digital signals in USB)
- IF2004/USB 4-channel RS422/USB converter (converter for up to 4 digital signals in USB)

Interface module for Industrial Ethernet connection
- IF2030/PNET
- IF2030/ENETIP

Accessories optoNCDT 1420/1402CL1
Supply and output cable (drag-chain suitable)
- PCF1420-1/I (1 m, output 4 ... 20 mA)
- PCF1420-1/I(01) (1 m, output 4...20 mA)
- PCF1420-3/I (3 m, output 4 ... 20 mA)
- PCF1420-6/I (6 m, output 4 ... 20 mA)
- PCF1420-10/I (10 m, output 4 ... 20 mA)
- PCF1420-15/I (15 m, output 4 ... 20 mA)
- PCF1420-3/U (3 m, with integrated resistor, output 1 ... 5 VDC)*
- PCF1420-6/U (6 m, with integrated resistor, output 1 ... 5 VDC)*
- PCF1420-10/U (10 m, with integrated resistor, output 1 ... 5 VDC)*
- PCF1420-15/U (15 m, with integrated resistor, output 1 ... 5 VDC)*
- PCF1420-3/IF2008 (3 m, interface and supply cable)
- PCF1420-6/IF2008 (6 m, interface and supply cable)
- PCF1420-10/IF2008 (10 m, interface and supply cable)
- PCF1420-3/C-Box (3 m)
* on request with output 2 ...10 VDC

Supply and output cable, suitable for use with robots
(available in 90° version)
- PCR1402-3/I (3 m)
- PCR1402-6/I (6 m)
- PCR1402-8/I (8 m)

Accessories for optoNCDT 1750BL / 1750DR / 1710 / 1710BL
Supply and output cable (drag-chain suitable)
- PC1700-3 (3 m)
- PC1700-10 (10 m)
- PC1700-10/IF2008 (10 m, for use with interface card IF2008)
- PC1750-3/C-Box (3 m)
- PC1750-6/C-Box (6 m)
- PC1750-9/C-Box (9 m)

Supply and output cable (suitable for use with robots)
- PCR1700-5 (5 m)
- PCR1700-10 (10 m)

Supply and output cables for temperatures up to 200 °C
- PC1700-3/OE/HT (3 m)
- PC1700-6/OE/HT (6 m)
- PC1700-15/OE/HT (15 m)

Protection housing
- SGH model (sizes S and M)
- SGHF model (sizes S and M)
- SGHF-HT model

Accessories for optoNCDT 2300/2300LL/2300BL/ 2300-2DR
Supply and output cable
- PC2300-0,5Y (connection cable to PC or PLC; for operation a PC2300-3/SUB-D will be required)
- PC2300-3/SUB-D (3 m; for operation a PC2300-0,5Y will be required)
- PC2300-3/IF2008 (interface and supply cable)
- PC2300-3/OE (3 m)
- PC2300-6/OE (6 m)
- PC2300-9/OE (9 m)
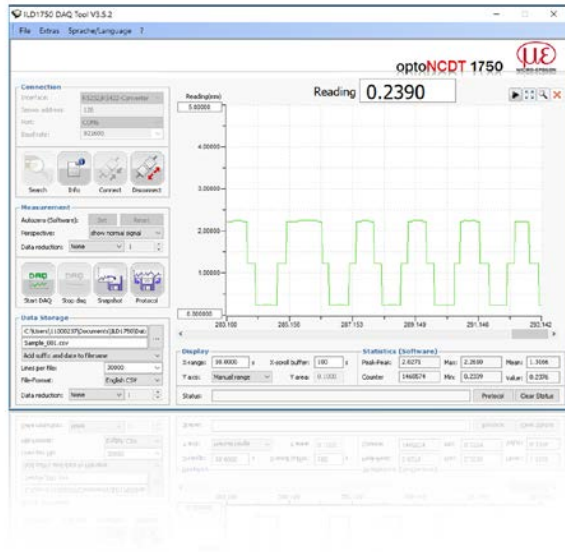- PC2300-15/OE (15 m)
- PC2300-3/C-Box/RJ45 (3 m)
* other cable lengths on request

Protection housing
- SGH model (sizes S and M)
- SGHF model (sizes S and M)
- SGHF-HT model

Supply and output cables for temperatures up to 200 °C
- PC2300-3/OE/HT (3 m)
- PC2300-6/OE/HT (6 m)
- PC2300-9/OE/HT (9 m)
- PC2300-15/OE/HT (15 m)

optoNCDT Demo Tool

The scope of supply includes a software for easy sensor configuration. The settings can be implemented conveniently via a Windows user interface on the PC. The sensor parameters are transmitted to the sensor via the serial port and can also be saved if required. The software is available as single and multi-channel version. The sensor is connected to the PC via the sensor cable using a USB converter.
[for any ILD sensor]

Free download

Download free of charge from www.micro-epsilon.com/download: software, driver and well-documented driver DLL for easy sensor integration in existing or customer software.

Protection housing for demanding environments

To protect the optoNCDT laser sensors in harsh environments, protective housings are available in different designs.

SGH model

Completely enclosed housing with an integrated front window, where the sensor measures through the window. The water-resistant housing provides protection against solvents and detergents.

SGHF model

With window and compressed-air connection ideal for high ambient temperatures. The integrated air cooling of the housing offers optimum protection for the sensor.

SGHF-HT model

This water-cooled protection housing with window and compressed-air connection is designed for measurement tasks in ambient temperatures up to 200 °C.
Suitable for all long-range sensors
optoNCDT 1710
optoNCDT 1750-500 and optoNCDT 1750-750
optoNCDT 2310
optoNCDT 2300 - 200
Maximum ambient temperature 200 °C
Maximum temperature of cooling water $T(max) = 10 \, °C$
Minimum water flow rate $Q(min) = 3$ liters/min

SGHx ILD size S (140x140x71 mm)
for optoNCDT 1750 / 2300 dimensions 97x75 mm

SGHx ILD size M (140x180x71 mm)
for optoNCDT 1750 / 2300 dimensions 150x80 mm

IF2008PCI / IF2008PCIe - PCI Interface card
for synchronous data acquisition

The absolutely synchronous data acquisition is a decisive factor for the planarity or thickness measurement using several laser sensors. The IF2008PCI interface card is designed for installation in PCs and enables the synchronous capture of four digital sensor signals and two encoders. The data are stored in a FIFO memory in order to enable resource-saving processing in blocks in the PC. The IF2008E expansion board enables to detect in addition two digital sensor signals, two analog sensor signals and eight I/O signals.

Special features
- IF2008 basic printed circuit board: 4 digital signals and 2 encoders
- IF2008E - Expansion board: 2x digital signals, 2x analog signals and 8x I/O signals

Interface card IF2008, IF2008E
for individual signal processing
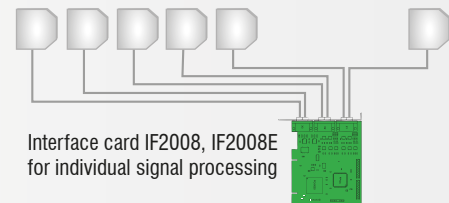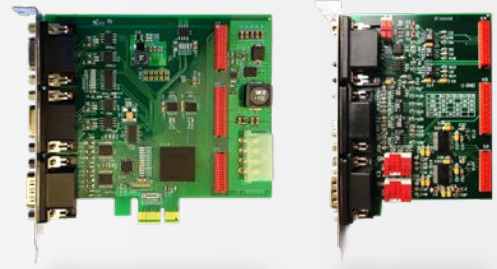
IF2001/USB converter RS422 to USB

The RS422/USB converter transforms digital signals from a laser-optical sensor into a USB data packet. The sensor and the converter are connected via the RS422 interface of the converter. Data output is done via USB interface. The converter loops through further signals and functions such as laser on/off, switch signals and function output. The connected sensors and the converter can be programmed through software.

RS422 ⟶ USB

IF2004/USB: 4-channel converter from RS422 to USB

The RS422/USB converter is used for transforming digital signals from up to four optical sensors into USB data signals. The converter has four trigger inputs and a trigger output for connecting additional converters. Data is output via an USB interface. The connected sensors and the converter can be programmed through software.

Special features
- 4x digital signals via RS422
- 4x trigger inputs, 1x trigger output
- Synchronous data acquisition
- Data output via USB

RS422
RS422
RS422 → USB
RS422

C-Box/2A Controller for D/A conversion and evaluation

C-Box/2A is used for fast D/A conversion of two digital input signals or for evaluating two digital sensor signals. The controller is compatible with the optoNCDT 1420, 1750 und 2300 models. Handling of the C-Box/2A and of the connected sensors are performed via web interface. Averaging functions, thickness, diameter, step and inclinations can be calculated. The D/A conversion is executed at 16 bit and max. 70 kHz.

Special features

- Trigger input
- Multi-function output
- Measurement value output via Ethernet, USB, analog output
  4 ... 20 mA / 0 ... 5 V / 0 ... 10 V / ±5 V / ±10 V
  (scalable via web interface)
- 2x switching outputs for sensors or C-Box/2A status
- Parallel data output via 3 output interfaces
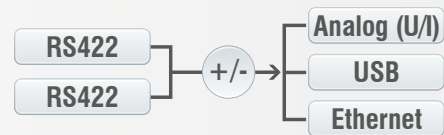

IF2030
Interface module for Industrial Ethernet connection

The IF2030 interface modules are designed for easy connection of Micro-Epsilon sensors to Ethernet-based fieldbuses, e.g., plant control systems. The PROFINET and Ethernet/IP modules are compatible with sensors that output data via an RS422 or RS485 interface. These modules operate on the sensor side with up to 4 MBd and have two network connections for different network topologies. Installation in switching cabinets is via a DIN rail.
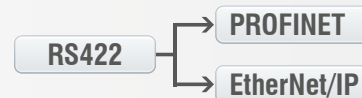
Sensors and Systems from Micro-Epsilon

Sensors and systems for displacement, distance and position

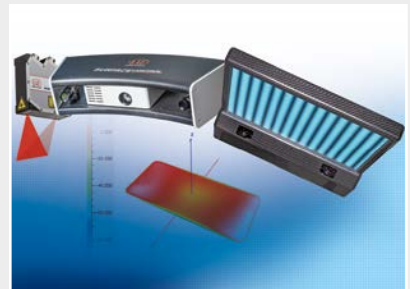Sensors and measurement devices for non-contact temperature measurement

Measuring and inspection systems for metal strips, plastics and rubber

Optical micrometers and fiber optics, measuring and test amplifiers

Color recognition sensors, LED analyzers and inline color spectrometers

3D measurement technology for dimensional testing and surface inspection

MICRO-EPSILON

MICRO-EPSILON USA
8120 Brownleigh Dr. · Raleigh, NC 27617 / USA
Phone +1/919/787-9707 · Fax +1/919/787-9706
me-usa@micro-epsilon.com · **www.micro-epsilon.com**